



US006675106B1

(12) **United States Patent**
Keenan et al.

(10) Patent No.: **US 6,675,106 B1**
(45) Date of Patent: ***Jan. 6, 2004**

(54) **METHOD OF MULTIVARIATE SPECTRAL ANALYSIS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 227 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **09/873,078**

(22) Filed: **Jun. 1, 2001**

(51) Int. Cl.⁷ **G06F 19/00; G06F 17/16**

(52) U.S. Cl. **702/28; 702/194; 702/196**

(58) Field of Search **702/27, 28, 189, 702/194, 196, 197; G06F 19/00, 17/16**

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(57)

ABSTRACT

A method of determining the properties of a sample from measured spectral data collected from the sample by performing a multivariate spectral analysis. The method can include: generating a two-dimensional matrix A containing measured spectral data; providing a weighted spectral data matrix D by performing a weighting operation on matrix A; factoring D into the product of two matrices, C and S^T , by performing a constrained alternating least-squares analysis of $D=CS^T$, where C is a concentration intensity matrix and S is a spectral shapes matrix; unweighting C and S by applying the inverse of the weighting used previously; and determining the properties of the sample by inspecting C and S. This method can be used to analyze X-ray spectral data generated by operating a Scanning Electron Microscope (SEM) with an attached Energy Dispersive Spectrometer (EDS).

106 Claims, 21 Drawing Sheets

